

# Customer Quality Newsletter

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## Breakthrough Quality Support Systems and Services

### Intel's Product Life Cycle

In the past few years, Intel's Quality and Reliability organization has developed and deployed programs to improve product quality and to positively impact customer yield (see Figure 1). These quality support services and processes are implemented at critical times in the Product Life Cycle (see Figure 2):

- Functional Analysis Correlation Request
- Customer Line Fallout
- Manufacturing Advantage Service
- On Site Verification

During any product life cycle, a combination of the above programs is implemented to assist the customer's ramp, as well as providing actionable data for new product introduction and sustaining improvements. While these programs are executed on specific products, future products benefit as well. This iterative process also enables Intel to set the quality goals for future product generations.

### Intel's Functional Analysis Correlation Request Support Service

Intel's Functional Analysis Correlation Request process provides specific product quality support when customers encounter suspect product. The Functional Analysis Correlation Request process for components typically involves a return of a few units for additional testing and correlation. Intel uses a 7-step Problem Solving

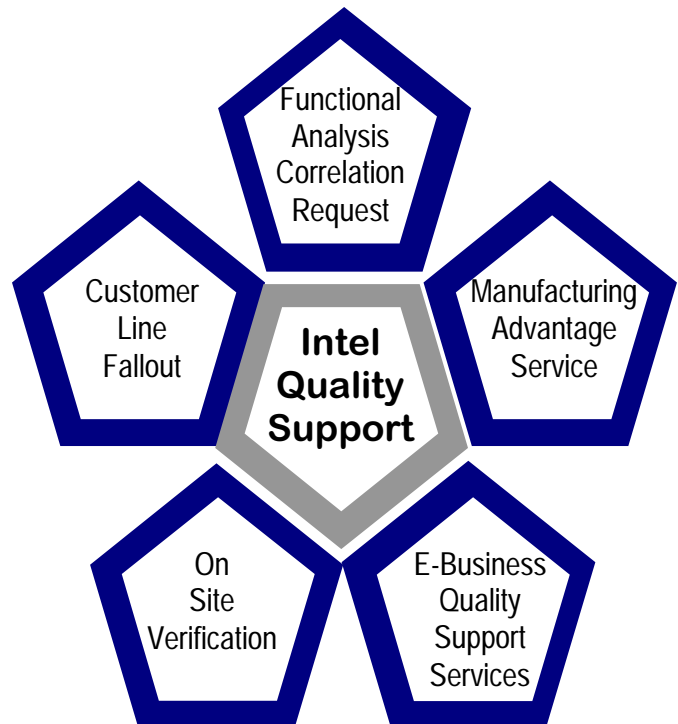


Figure 2.

methodology to resolve customers quality concerns. Understanding the "problem" and defining the correct "problem statement" is critical in supporting requests quickly and efficiently. *Providing the Intel part number and date of purchase when requesting an Intel Functional Analysis Correlation Request expedites this analysis process.*

### Customer Line Fallout Support

The aim of the Customer Line Fallout program is to observe the customer experience real time and apply the learning to our manufacturing lines. This is achieved by partnering with a subset of customers, and involves an intense interaction over the course of the new product introduction. This is often performed on a very limited

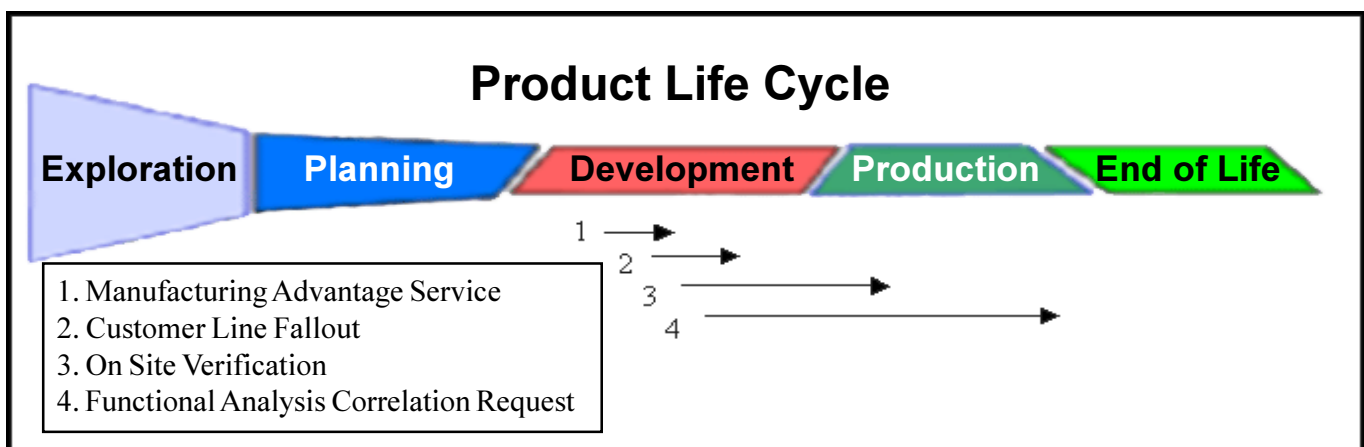


Figure 1.

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basis. The customer provides a product defect rate of the target Intel product as observed in their manufacturing line. In exchange, Intel correlates this information against an internal quality monitor and implements corrective actions if discrepancies or test holes are found. Intel identifies potential customer manufacturing issues and drives the findings to a broader customer base. The processor remarking issue is one example where findings were shared. An Intel communication was sent out through the field Customer Quality Engineers, and an article was published in the July 2001 issue of the Intel Customer Quality Newsletter.

### ***On Site Verification Support***

Intel at times, partners with its customers to develop, enable or set up On Site Verification that allows for a quick turnaround on failure symptom information. The analysis is usually a go/no-go analysis of customer line and field failures. This has proved valuable in cases where suspect miscorrelation or customer-induced issues occur, and a relatively high cost of Intel products is concerned. On Site Verification is primarily implemented to coincide with new product introduction high volume manufacturing ramp within Intel, and can also serve a secondary function of reducing false returns that are otherwise fully functional parts.

### ***Intel e-Business and Manufacturing Advantage Services***

Intel e-Business support encompasses customer services over the Internet through the Intel Business Link. These support services were featured in the May and July 2001 Intel Customer Quality Newsletters. Intel offers Manufacturing Advantage Tips for many of the new products and technologies.

### ***The Benefits of Becoming Involved***

Intel's Customer Quality and Reliability group is always looking for new and innovative ways to improve product quality, and quality services. Some customers have engaged with Intel in unconventional technical quality support areas, such as call center scripting and benchmarking. Intel recognizes that customers have

different needs based on market concerns, manufacturing infrastructure and geographical diversities. The best way to determine the most effective Intel quality support program or service is to contact your local account Customer Quality Engineer or Intel Sales Representative. They can point out which customer programs or product support services are available to you in your area.

(Disclaimer) NOTE: Not all programs or services are available on all products, or to all customers, or in all geographies.

## Breaking News

### **Prevention Advocated in Asia-Pacific Collaboration Effort**

Intel's Asia Pacific (APac) Customer Quality & Reliability (CQR) organization has successfully collaborated with customers on manufacturing ESD/EOS (electrostatic discharge/electrical overstress) prevention. The organization has proactively engaged with customers throughout the APac region including Taiwan, Korea, India, and the Philippines to provide this service. The primary focus areas are Orientation and Customer Line Assessment.

Orientation activities focus on ESD/EOS prevention concepts and methodology. The Customer Line Assessment activity involves an in-depth look into the customer's manufacturing line to assess ESD prevention practices and controls. This activity is carried out in partnership with the customer for demonstrating the Intel approach to performing a manufacturing line assessment for ESD. The results of the assessment are shared with the customers. These highlight the good practices and systems observed and provide opportunities for ESD/EOS prevention improvements.

The proactive engagement by APac CQR in the EOS/ESD prevention has enabled customers to resolve ESD/EOS issues as one of the more common problems in their manufacturing lines. CQR is committed to providing excellent proactive service quality, and this activity is one example that highlights our commitment.

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## Breaking News (continued)

### Intel Hosts Korea Mobile Manufacturing Forum (June 13, 2001)

Intel's Customer Quality and Reliability organization held the 2001 Korea Mobile Manufacturing Forum to enable key Korean Original Equipment Manufacturers (OEMs) on Micro Flip Chip pin grid array and Micro Flip Chip ball grid array technologies, including Socket 478. A large number of OEMs, including engineers and managers from manufacturing, quality assurance, and research and development, attended the forum. Socket 478 enabling vendors, Foxconn\* and Tyco Electronics Corporation (AMP), delivered a highly productive showcase and demonstration. Customers participated in a question and answer session addressing manufacturing issues and concerns. Both the forum and the session received excellent customer feedback on the content and organization.

## Product Health

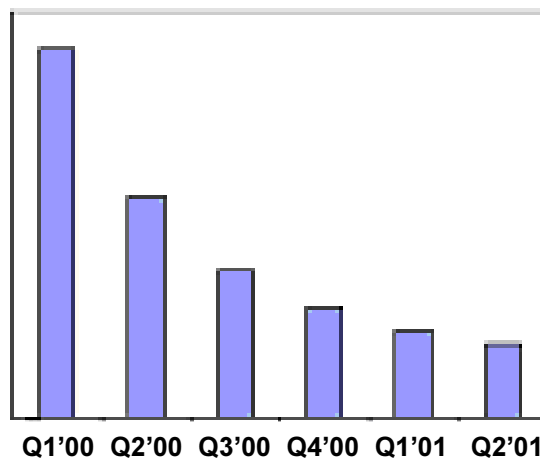
### Flash Products Group: Customer service begins with the sale

The mission of the Flash Products Group (FPG) is to deliver the highest levels of customer service, quality, and technology leadership available. Since customer service begins with the sale, FPG has established a network of Customer Support Centers worldwide to underscore that commitment, and ensure Intel® Flash products integrate seamlessly into each customer's applications. These centers offer Intel's vast design and technology development resources to find the best solutions possible.

Quality has always been a key characteristic of FPG products. Intel pioneered the use of Statistical Process Control in semiconductor fabrication, assembly, and test. FPG uses Statistical Process Control data to tighten process distributions and improve quality, resulting in continuously rising levels of quality. The most recent survey of FPG customer satisfaction revealed that 96% of customers view Intel® Flash quality as excellent.

## Product Health (continued)

0.25um Flash Defect Per Million (DPM) Trend



Statistical Process Control Chart Showing Flash Defect Reductions Over Time

Technology leadership continues to be fast paced in FPG. Intel invented the NOR-type ETOX™ flash memory in 1988. This year, FPG is ramping its sixth generation 0.18um flash memory technology into production. This technology, combined with the FPG innovation of Intel® StrataFlash™ memory and leading edge packaging solutions, enables Intel to lead all other NOR flash memory suppliers in cost and performance.

The Flash Products Group's commitment to quality continues to deliver excellent customer service, quality service, and technology leadership to ensure the success of Intel's customers.

## Do You Know?

### Intel Quality - No Accident!

Intel's product quality does not happen by accident. The consistent methodologies used at Intel are key to ensuring our high quality standards. Each of these methods reflects a unique aspect of Intel Quality.

### Process Technology Certifications

A process becomes certified after becoming low risk for

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product introduction and ramp. Intel's certification methodology continues to evolve as a result of customer feedback, as well as process, package and product development system improvements.

Manufacturability requirements covering design and execution are also important. Use of indicators such as critical-step process control capability, line yield, die yield and in-line monitors have resulted in better integration of quality and reliability, and engineering development teams.

### ***Assembly Technology Development***

New assembly technology development occurs in the discovery, development and deployment phases.

- During discovery, product needs, design, material, process and equipment options are evaluated. Technology and business plans become aligned with the Technology Target Specification.
- During development, the package or board technology is put through continuous certification, driving process and material capability, stability, reliability and manufacturability improvements.
- During deployment, the technology first ramped in the development factory is then transferred to a high-volume manufacturing plant where yield, manufacturability and reliability targets continue to be the focus.

### ***Product Design in Quality and Reliability***

Design for Quality and Reliability consists of tools and methods enabling Intel to design quality and reliability into new products. The benefit of this is faster time to product quality and reliability, which lowers risks during initial production ramp.

### ***Product Qualification***

Intel product qualifications consist of three levels designed to meet Intel and customer product introduction, and production ramp needs. At any of the three qualification levels, there can be no indications of issues with potentially serious ramifications for Intel or our

customers. The three levels are:

- Prototype Qualification intended for initial design-in and prototypes,
- Production Qualification intended for early production and formal customer qualifications, and
- Full Qualification intended for full production and unlimited shipments.

### ***Manufacturing Quality System***

Continuous improvement methodologies are ingrained in our manufacturing process and are vigorously supported by the ISO 9002 registration standard, the baseline quality system for all of our mature factories worldwide.

### ***Conversion Management***

An extensive Change Management Network manages conversions from change inception through internal qualifications, to customer notification and acceptance. Change Control Boards track conversions from initiation through change implementation.

### ***Material Supplier Quality Control***

The Corporate Materials Organization controls all incoming materials used in Intel's manufacturing. The quality improvement methodology applied meets current and future materials requirements and is embodied in our Supplier Continuous Quality Improvement program.

### ***Subcontractor Quality Control***

Intel uses subcontractors to perform some or all of the manufacturing process. Only suppliers who meet our high standards are qualified to manufacture products bearing the Intel logo. Process certifications and product qualifications are performed to the same specifications used for our internal factories and products.

### ***Corporate Quality Assessments***

Intel's Quality Assessment methodology links assessment activities to business planning processes, thus providing a global focus. The product performance is balanced with quality system performance; external requirements are

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## Do You Know? (continued)

balanced with internal business needs. The ISO 9000 standard provides the baseline criteria for internal assessments. Customer requirements are met through (1) valid baseline performance, (2) use of common practices, and (3) increased accountability at the source. Plant auditors for each site own and manage the internal audit program to ensure processes and systems comply with the ISO Standard.

## Policy Statement

All Intel businesses and subsidiaries  
will be recognized as  
**#1, #2 or Excellent**  
for  
Product and Service Quality  
in the markets they serve.

## Customer Feedback

### An Opportunity to Share Your Thoughts

We value your readership and would like to hear from you. Please send your feedback to the Intel Customer Quality Newsletter e-mail address:  
[customer.quality.newsletter@intel.com](mailto:customer.quality.newsletter@intel.com)

### Intel's Quality Principle

World-class Quality is an essential ingredient for Intel's success. In order to maintain our industry leadership, we are committed to making quality an integral part of every aspect of our business. As a diverse company serving numerous markets and customers, we will also continuously strive to deliver an outstanding quality image for all Intel and affiliated brands.

## Quality Information Center

|                                                                                           |                                                                                                  |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| FACR:                                                                                     | 1-800-628-8686 (in North America)<br>or contact your local Customer Quality Engineer             |
| Intel Developer:                                                                          | <a href="http://developer.intel.com">developer.intel.com</a>                                     |
| Intel Quality System:                                                                     | <a href="http://developer.intel.com/design/quality">developer.intel.com/design/quality</a>       |
| Intel's OEM Customer:                                                                     | <a href="http://oem.intel.com">oem.intel.com</a>                                                 |
| Intel's Channel Support:                                                                  | <a href="http://channel.intel.com">channel.intel.com</a>                                         |
| Contact your local Sales Representative<br>for more information or visit our web site at: | <a href="http://support.intel.com">support.intel.com</a>                                         |
| Feedback and Comments:                                                                    | Contact your local Field Sales Engineer or Customer Quality Engineer for more details.           |
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